IN THE UNITED STATES DISTRICT COURT
FOR THE DISTRICT OF DELAWARE

GENZYME CORPORATION and AVENTIS INC., Plaintiffs, v. NOVARTIS GENE THERAPIES, INC., NOVARTIS PHARMACEUTICALS CORPORATION, and NOVARTIS AG, Defendants.	C.A. No. 21-1736-RGA

DEFENDANTS' ANSWER, DEFENSES, AND COUNTERCLAIMS

Defendants Novartis Gene Therapies, Inc. ("NGT"), Novartis Pharmaceuticals Corporation ("NPC"), and Novartis AG (collectively, "Defendants"), by and through their attorneys, respectfully submit this Answer, Defenses, and Counterclaims to the First Amended Complaint filed by Plaintiffs Genzyme Corporation ("Genzyme") and Aventis Inc. ("Aventis") (collectively, "Plaintiffs") on February 23, 2022. Defendants respond in numbered paragraphs corresponding to numbered paragraphs of the First Amended Complaint, and in doing so deny the allegations of the First Amended Complaint except as otherwise specifically stated.

The headings and subheadings in this Answer are used solely for purposes of convenience and organization to mirror those appearing in the First Amended Complaint. To the extent that any headings or other non-numbered statements in the First Amended Complaint contain or imply any allegations, Defendants deny each and every allegation therein.

Nature of the Action

1. This is a civil action under the Patent Act, 25 U.S.C. § 1 *et seq.*, for infringement of United States patents. Specifically, Plaintiffs allege that Defendants infringe United States Patent No. 6,596,535 (the "'535 Patent"); United States Patent No. 7,125,717 (the "'717 Patent");

United States Patent No. 7,785,888 (the "'888 Patent"), United States Patent No. 7,846,729 (the "'729 Patent"), United States Patent No. 8,093,054 (the "'054 Patent"), and United States Patent No. 9,051,542 (the "'542 Patent") (collectively, the "Asserted Patents") through the unauthorized manufacture, use, and sale of recombinant adeno-associated virus vectors ("rAAV vectors") for their gene therapy drug Zolgensma®.

ANSWER: Defendants admit that Plaintiffs filed this infringement action for patent infringement of United States Patent No. 6,596,535 (the "'535 patent"); United States Patent No. 7,125,717 (the "'717 patent"); United States Patent No. 7,785,888 (the "'888 patent"); United States Patent No. 7,846,729 (the "'729 patent"); United States Patent No. 8,093,054 (the "'054 patent"); and United States Patent No. 9,051,542 (the "'542 patent") (collectively, the "Asserted Patents") alleging that Defendants have or will infringe the Asserted Patents. Paragraph 1 of the First Amended Complaint contains legal conclusions to which no response is required. To the extent any response is required, Defendants deny those allegations. Defendants deny that they have or will infringe any valid and enforceable claim of the Asserted Patents through the manufacture, use, and sale of ZOLGENSMA®. Except as expressly admitted, Defendants deny the remaining allegations in Paragraph 1.

The Parties

2. Plaintiff Genzyme is a corporation organized and existing under the laws of the Commonwealth of Massachusetts, having its principal place of business at 50 Binney Street, Cambridge, Massachusetts 02142.

ANSWER: Upon information and belief, Defendants admit that Genzyme is a corporation organized and existing under the laws of the Commonwealth of Massachusetts with its principal place of business at 50 Binney Street, Cambridge, Massachusetts 02142.

3. Plaintiff Aventis is a limited liability company organized and existing under the laws of the State of Delaware with its principal place of business at 55 Corporate Drive, Bridgewater, New Jersey 08807. Genzyme is a wholly-owned subsidiary of Aventis.

ANSWER: Upon information and belief, Defendants admit that Aventis is a limited

liability company organized and existing under the laws of the State of Delaware with its principal place of business at 55 Corporate Drive, Bridgewater, New Jersey 08807. As to the remaining allegations contained in Paragraph 3, Defendants are without knowledge or information sufficient to form a belief as to their truth, and therefore deny the same.

4. On information and belief, Novartis Gene Therapies, Inc. is a corporation organized and existing under the laws of Delaware, having its corporate offices and principal place of business at 2275 Half Day Road, Suite 203, Bannockburn, Illinois 60015. On information and belief, Novartis Gene Therapies may be served via its registered agent, Corporation Service Company, 251 Little Falls Drive, Wilmington, Delaware 19808.

ANSWER: Defendants admit that NGT is a corporation organized and existing under the laws of the State of Delaware with its principal place of business at 2275 Half Day Road, Suite 200, Bannockburn, Illinois 60015. Defendants further admit that NGT may be served via its registered agent, Corporation Service Company, 251 Little Falls Drive, Wilmington, Delaware 19808.

5. On information and belief, Novartis Pharmaceuticals Corporation is a corporation organized and existing under the laws of Delaware, having its corporate offices and principal place of business at 1 Health Plaza, East Hanover, New Jersey 07936. On information and belief, Novartis Pharmaceuticals Corporation may be served via its registered agent Corporation Service Company, 251 Little Falls Drive, Wilmington, Delaware 19808. On information and belief, Novartis Pharmaceuticals Corporation is the direct or indirect parent of Novartis Gene Therapies, Inc. and has at all times directed and controlled the infringing actions of its subsidiary.

ANSWER: Defendants admit that NPC is a corporation organized and existing under the laws of the State of Delaware with corporate offices and its principal place of business at One Health Plaza, East Hanover, New Jersey 07936. Defendants further admit that NPC may be served via its registered agent Corporation Service Company, 251 Little Falls Drive, Wilmington, Delaware 19808. Except as expressly admitted, Defendants deny the remaining allegations in Paragraph 5.

6. On information and belief, Novartis AG is a corporation organized and existing under the laws of Switzerland, having its corporate offices and principal place of business at Fabrikstrasse 2, 4056 Basel, Switzerland. On information and belief, Novartis AG is the direct or indirect parent of Novartis Pharmaceuticals Corporation and Novartis Gene Therapies, Inc. and has at all times directed and controlled the infringing actions of its subsidiaries.

ANSWER: Defendants admit that Novartis AG is a corporation organized and existing under the laws of Switzerland with corporate offices and its principal place of business at Fabrikstrasse 2, 4056 Basel, Switzerland. Defendants admit that Novartis AG is the direct or indirect parent of NPC and NGT. Except as expressly admitted, Defendants deny the remaining allegations in Paragraph 6.

Jurisdiction and Venue

7. This Court has subject matter jurisdiction over this action under 28 U.S.C. §§ 1331 and 1338(a).

ANSWER: Paragraph 7 of the First Amended Complaint contains legal conclusions to which no response is required. To the extent a response is required, Defendants do not contest that this Court has jurisdiction over the subject matter of this action pursuant to 28 U.S.C. §§ 1331 and 1338(a).

8. This Court has personal jurisdiction over Novartis Gene Therapies, Inc. for at least the reasons that Novartis Gene Therapies, Inc. is incorporated in Delaware, knowingly transacts business in Delaware, maintains a registered agent in Delaware, and, on information and belief, has engaged in, and made meaningful preparations to engage in, infringing conduct in Delaware.

ANSWER: Paragraph 8 of the First Amended Complaint contains legal conclusions to which no response is required. To the extent a response is required, NGT does not contest personal jurisdiction in the United States District Court for the District of Delaware for the limited purposes of this civil action only. Defendants deny the remaining allegations in Paragraph 8.

9. This Court has personal jurisdiction over Novartis Pharmaceuticals Corporation because Novartis Pharmaceuticals Corporation is incorporated in Delaware, knowingly transacts

business in Delaware, maintains a registered agent in Delaware, avails itself of this Court in numerous lawsuits that it and/or its related entities have filed before this Court, and, on information and belief, has engaged in, and made meaningful preparations to engage in, infringing conduct in Delaware.

ANSWER: Paragraph 9 of the First Amended Complaint contains legal conclusions to which no response is required. To the extent a response is required, NPC does not contest personal jurisdiction in the United States District Court for the District of Delaware for the limited purposes of this civil action only. Defendants deny the remaining allegations in Paragraph 9.

10. On information and belief, this Court may exercise personal jurisdiction over Novartis AG because of its contacts with this forum, including its regularly and intentionally doing business here, availing itself of this Court in numerous lawsuits that it and/or its related entities have filed before this Court, and/or committing acts giving rise to this lawsuit here. Alternatively, on information and belief, this Court may exercise personal jurisdiction over Novartis AG under Federal Rule of Civil Procedure 4(k)(2).

ANSWER: Paragraph 10 of the First Amended Complaint contains legal conclusions to which no response is required. To the extent any response is required, Novartis AG contests personal jurisdiction in the United States District Court for the District of Delaware. Novartis AG is a corporation that is organized and exists under the laws of Switzerland. Defendants deny the remaining allegations in Paragraph 10.

11. Venue is proper in this district pursuant to 28 U.S.C. § 1400(b) with respect to Novartis Gene Therapies, Inc. for at least the reason that it resides in this district.

ANSWER: Paragraph 11 of this First Amended Complaint contains legal conclusions to which no response is required. To the extent a response is required, NGT does not contest venue in the United States District Court for the District of Delaware for the limited purposes of this civil action only.

12. Venue is proper in this district pursuant to 28 U.S.C. § 1400(b) with respect to Novartis Pharmaceuticals Corporation for at least the reason that it resides in this district.

ANSWER: Paragraph 12 of this First Amended Complaint contains legal conclusions to which no response is required. To the extent a response is required, NPC does not contest venue in the United States District Court for the District of Delaware for the limited purposes of this civil action only.

13. Venue is proper in this district pursuant to at least 28 U.S.C. § 1391(b) and (c) with respect to Novartis AG.

ANSWER: Paragraph 13 of this First Amended Complaint contains legal conclusions to which no response is required. To the extent a response is required, and maintaining that personal jurisdiction as to Novartis AG is not proper, Novartis AG does not contest venue under 28 U.S.C. § 1391(c) in the United States District Court for the District of Delaware for the limited purposes of this civil action only. Defendants deny the remaining allegations in Paragraph 13.

Statement of Facts

Background of the Technology at Issue

14. The Asserted Patents relate to recombinant viral vectors useful in gene therapy (among other things), as well as methods for the preparation, use, and/or storage of such vectors. Gene therapy is a groundbreaking medical technique to treat or cure disease by modifying a person's own genes. One mechanism by which gene therapy can work is by introducing functional copies of a gene (called a "transgene") into a patient's cells that have a faulty or missing natural version of the gene. By doing so, gene therapy can treat, or even cure, a genetic disorder.

ANSWER: Defendants admit that the Asserted Patents purport to relate to recombinant viral vectors and methods for the preparation, use, and/or storage of such vectors. Defendants further admit that gene therapy aims to treat diseases by replacing, inactivating or introducing genes into cells - either inside the body (in vivo) or outside the body (ex vivo). Except as expressly admitted, Defendants deny the remaining allegations in Paragraph 14.

15. Gene therapy can be performed by packaging and delivering a transgene to the cells of a patient using recombinant viral vectors, such as recombinant adeno-associated virus (rAAV)

vectors that are incorporated into adeno-associated virus (AAV). However, obtaining sufficient levels of transgene expression can be a hurdle for effective gene therapy. In some cells, expression of the transgene necessary to provide a therapeutic effect can be slow to initiate or does not initiate at all.

ANSWER: Defendants admit that AAV (adeno-associated virus)-based therapies have the potential to deliver new or working copies of a missing or nonworking gene to human cells. Defendants are without knowledge or information sufficient to form a belief as to the truth of the remaining allegations contained in Paragraph 15, and therefore deny the same.

16. When an AAV virus containing a rAAV vector is administered to a patient, a single-stranded viral vector DNA containing the transgene is transferred into a target cell. The incoming single-stranded DNA must then be converted to a double-stranded DNA molecule by the target cell's own cellular mechanisms. This formation of double-stranded DNA is a key rate-limiting step in the transfer of genetic material from the rAAV vector and the ultimate ability for expression of the transgene in a cell. Thus, double-stranded DNA formation is needed for efficient expression of a therapeutic protein and for functional gene therapy.

ANSWER: Defendants admit that AAV (adeno-associated virus)-based therapies have the potential to deliver new or working copies of a missing or nonworking gene to human cells. Defendants are without knowledge or information sufficient to form a belief as to the truth of the remaining allegations contained in Paragraph 16, and therefore deny the same.

17. The inventor of the '535, '717, '888, '729, and '054 Patents (collectively the "Carter Patents"), Dr. Barrie J. Carter, discovered that rAAV vector DNA can be engineered to self-adopt a double-stranded conformation upon delivery to a target cell, and can be packaged in a manner to facilitate this conformation so that the cellular processes needed to express the therapeutic protein encoded by the vector transgene can begin immediately once the vector is introduced into the cell. In other words, the vectors described in the Carter Patents eliminate the need for the target cell to convert single-stranded DNA to double-stranded DNA. The Carter Patents refer to this technology as vectors with "intrastrand base pairing," which are also widely known in the field as "self-complementary vectors." Using the intrastrand base pairing technology of the Carter Patents, the onset of gene expression is increased, so more cells can receive genetic material at a given dose of rAAV vector or the rAAV vector can be effective at a lower dose as compared to any prior rAAV vectors. This discovery formed the basis for later improvements on different ways to generate self-complementary vectors, which have now been incorporated into important gene therapy platforms.

ANSWER: Defendants admit that Barrie J. Carter is listed as the inventor on the face of the ’535 patent, the ’717 patent, the ’888 patent, the ’729 patent, and the ’054 patent. Defendants are without knowledge or information sufficient to form a belief as to the truth of the remaining allegations contained in Paragraph 17, and therefore deny the same.

18. Another challenge in effectively implementing gene therapy is ensuring that it can be delivered in a safe, efficient way. A complication in delivery is the low stability and solubility of rAAV vector particles in buffered solutions, which may lead to aggregation of rAAV vector particles (particularly at higher concentrations of rAAV). Aggregation can negatively impact virus biodistribution and transduction efficiency, and can also increase immunogenicity following virus administration. The inventors of the ’542 Patent, John Fraser Wright and Guang Qu, solved these problems in discovering that certain high ionic strength solutions for preparing and storing rAAV viruses can prevent significant aggregation of virus particles at the viral concentrations needed for effective gene therapy.

ANSWER: Defendants admit that John Fraser Wright and Guang Qu are listed as the inventors on the face of the ’542 patent. Defendants are without knowledge or information sufficient to form a belief as to the truth of the remaining allegations contained in Paragraph 18, and therefore deny the same.

19. Thus, the Asserted Patents represent significant advances that allow for functional gene therapy.

ANSWER: Defendants deny the allegations in Paragraph 19.

The Carter Patents were Licensed

20. Building upon the technology of the Asserted Patents, Dr. Richard Samulski’s laboratory at the University of North Carolina identified one way to form the intrastrand base pairing vectors described by the Asserted Patents. In May 2013, Asklépios BioPharmaceutical, Inc (“AskBio”), which was co-founded by Dr. Samulski, entered into a license agreement with Genzyme, whereby AskBio received certain rights to the Carter Patents. The rights that Genzyme licensed to AskBio included a limited right to sublicense. Notably, the rights Genzyme licensed to AskBio expressly excluded the field of treating spinal muscular atrophy (SMA). AskBio therefore could not have sublicensed rights related to treating SMA.

ANSWER: Paragraph 20 of the First Amended Complaint contains legal conclusions to which no response is required. To the extent a response is required, Defendants are without

knowledge or information sufficient to form a belief as to the truth of the allegations contained in Paragraph 20, and therefore deny the same.

21. Two years later, on May 29, 2015, upon information and belief, AskBio entered into a licensing agreement with AveXis, Inc. (now Novartis Gene Therapies, Inc.), which granted AveXis, Inc. certain rights to AskBio's "self-complementary" patent portfolio. On information and belief, based on, at least the due diligence related to the AskBio-AveXis, Inc. license, Novartis Gene Therapies, Inc. was aware of the Carter Patents before it began marketing Zolgensma®. Because AskBio had no rights to the Carter Patents in relation to SMA, however, its license to AveXis, Inc. could not include any rights related to the treatment of SMA.

ANSWER: Paragraph 21 of the First Amended Complaint contains legal conclusions to which no response is required. To the extent a response is required, Defendants admit that AskBio entered into a licensing agreement with AveXis Inc. on May 29, 2015, and that AveXis Inc. was renamed Novartis Gene Therapies, Inc. Except as expressly admitted, Defendants deny the remaining allegations in Paragraph 21.

22. Despite the express carve-out of SMA from the Genzyme-AskBio license (and therefore the AskBio-AveXis, Inc. license), on information and belief AveXis, Inc. used the technology licensed from AskBio to generate Zolgensma® for treatment of SMA.

ANSWER: Defendants deny the allegations in Paragraph 22.

Zolgensma®

23. On April 9, 2018, Novartis AG announced that it had entered into an agreement to acquire AveXis, Inc. On May 15, 2018, the transaction closed and AveXis, Inc. became a wholly-owned indirect subsidiary of Novartis AG. The closing of the transaction was accompanied by a press release quoting the CEOs of Novartis AG and Novartis Pharmaceuticals Corporation regarding the relationship with AveXis, Inc.

ANSWER: Defendants admit that on April 9, 2018, Novartis announced it had "entered into an agreement and plan of merger with AveXis, Inc." Defendants further admit that, on May 15, 2018, Novartis AG announced it had "completed the acquisition of AveXis, Inc." and "[a]s a result of the merger, AveXis became an indirect wholly-owned subsidiary of Novartis," and

included statements from the CEOs of Novartis AG and NPC. Except as expressly admitted, Defendants deny the remaining allegations in Paragraph 23.

24. On May 24, 2019, AveXis, Inc. obtained FDA approval to market Zolgensma® (onasemnogene abeparvovec-xioi) as a gene therapy product intended to treat certain children less than two years of age with SMA. On September 2, 2020, Novartis AG announced that AveXis, Inc. had been renamed and rebranded as Novartis Gene Therapies, Inc.

ANSWER: Defendants admit that ZOLGENSMA® (onasemnogene abeparvovec-xioi) was approved by the FDA on May 24, 2019 and is indicated for the treatment of pediatric patients less than 2 years of age with spinal muscular atrophy (SMA) with bi-allelic mutations in the survival motor neuron 1 (SMN1) gene. Defendants admit that on September 2, 2020 Novartis announced that it "renamed the previously acquired AveXis to Novartis Gene Therapies." Except as expressly admitted, Defendants deny the remaining allegations in Paragraph 24.

25. Following FDA approval of Zolgensma®, AveXis, Inc. promptly began sales and active promotion of the product in the United States for the treatment of SMA, and has continued sales and promotion after being renamed Novartis Gene Therapies, Inc. Zolgensma® is a gene therapy product indicated for use in certain children less than two years old with SMA. A true and correct copy of the current Zolgensma® package insert dated October 2021 is attached as Exhibit A.

ANSWER: Defendants admit that ZOLGENSMA® (onasemnogene abeparvovec-xioi) was approved by the FDA on May 24, 2019 and is indicated for the treatment of pediatric patients less than 2 years of age with spinal muscular atrophy (SMA) with bi-allelic mutations in the survival motor neuron 1 (SMN1) gene. Defendants admit that AveXis Inc. (later renamed NGT) began selling and promoting ZOLGENSMA® in the United States for the treatment of SMA following FDA approval, and continues to do so today. Defendants admit that Exhibit A to the First Amended Complaint appears to be a copy of the ZOLGENSMA® package insert dated October 2021. Except as expressly admitted, Defendants deny the remaining allegations of Paragraph 25.

26. Zolgensma® is an adeno-associated virus (AAV)-based gene therapy product that delivers a copy of the human survival motor neuron (SMN) gene into target motor neuron cells of the child, which results in expression of the SMN protein in the motor neuron cells. The Zolgensma® drug product infringes the Asserted Patents by (i) using AskBio's self-complementary rAAV vectors, which are covered by and based on the fundamental innovation of the Carter Patents, as well as (ii) using the formulation of the '542 Patent to store the rAAV vector particles to avoid harmful aggregation.

ANSWER: Defendants admit that ZOLGENSMA® is an adeno-associated virus vector-based gene therapy for intravenous infusion, namely a recombinant self-complementary AAV9 containing a transgene encoding the human survival motor neuron (SMN) protein, indicated for the treatment of pediatric patients less than 2 years of age with spinal muscular atrophy (SMA) with bi-allelic mutations in the survival motor neuron 1 (SMN1) gene. Paragraph 26 of the First Amended Complaint contains legal conclusions to which no response is required. To the extent a response is required, Defendants deny those allegations. Defendants deny that the ZOLGENSMA® drug product infringes any valid and enforceable claim of the Asserted Patents. Except as expressly admitted, Defendants deny the remaining allegations in Paragraph 26.

27. On information and belief, Zolgensma® has been and is currently manufactured by Novartis Gene Therapies, Inc. in Libertyville, Illinois and Durham, North Carolina. On information and belief, Zolgensma® was previously also manufactured in Longmont, Colorado.

ANSWER: Defendants admit the allegations in Paragraph 27.

Patents-in-Suit

28. The '535 Patent, entitled "Metabolically Activated Recombinant Viral Vectors and Methods for the Preparation and Use," issued on July 22, 2003 to inventor Dr. Barrie J. Carter. The '535 Patent was originally assigned to Targeted Genetics Corporation, then was subsequently assigned to Genzyme Corporation. A true and correct copy of the '535 Patent is attached as Exhibit B.

ANSWER: Defendants admit that Exhibit B to the First Amended Complaint is a purported copy of the '535 patent. Defendants admit that the face of the '535 patent states that the '535 patent is titled "Metabolically Activated Recombinant Viral Vectors and Methods for

the Preparation and Use"; that the '535 patent was issued by the U.S. Patent and Trademark Office on July 22, 2003; that the '535 patent's named inventor is Barrie J. Carter; and that the '535 patent was assigned to Targeted Genetics Corporation. Defendants admit that the website of the U.S. Patent and Trademark Office lists a subsequent assignment of the '535 patent from Targeted Genetics Corporation to Genzyme Corporation. Except as expressly admitted, Defendants deny the remaining allegations in Paragraph 28.

29. The '535 Patent issued from U.S. Patent Application No. 09/634,126, which claims priority to U.S. Provisional Patent Application No. 60/160,080, which was filed on August 9, 1999.

ANSWER: Defendants admit that the '535 patent states on its face that it issued from U.S. Patent Application No. 09/634,126 and that it claims priority to U.S. Provisional Patent Application No. 60/160,080 converted from U.S. Patent Application No. 09/370,565, filed August 9, 1999. Defendants are without knowledge or information sufficient to form a belief as to the truth of the remaining allegations contained in Paragraph 29, and therefore deny the same.

30. The '535 Patent expired on August 8, 2020. It was valid and enforceable under United States Patent Laws during its term and when the infringement occurred.

ANSWER: Defendants deny that the '535 patent was ever valid and enforceable. Paragraph 30 of the First Amended Complaint contains legal conclusions to which no response is required. To the extent any response is required, Defendants are without knowledge or information sufficient to form a belief as to the truth of the remaining allegations contained in Paragraph 30, and therefore deny the same.

31. The '717 Patent, entitled "Metabolically Activated Recombinant Viral Vectors and Methods for the Preparation and Use," issued on October 24, 2006 to inventor Dr. Barrie J. Carter. The '717 Patent issued from a continuation of the '535 Patent. The '717 Patent was originally assigned to Targeted Genetics Corporation, then was subsequently assigned to Genzyme Corporation. A true and correct copy of the '717 Patent is attached as Exhibit C.

ANSWER: Defendants admit that Exhibit C to the First Amended Complaint is a purported copy of the '717 patent. Defendants admit that the face of the '717 patent states that the '717 patent is titled "Metabolically Activated Recombinant Viral Vectors and Methods for their Preparation and Use"; that the '717 patent was issued by the U.S. Patent and Trademark Office on October 24, 2006; that the '717 patent's named inventor is Barrie J. Carter; that the '717 patent issued from a continuation of U.S. Patent Application No. 09/634,126, now U.S. Patent No. 6,596,535; and that the '717 patent was assigned to Targeted Genetics Corporation. Defendants admit that the website of the U.S. Patent and Trademark Office lists a subsequent assignment of the '717 patent from Targeted Genetics Corporation to Genzyme Corporation. Except as expressly admitted, Defendants deny the remaining allegations in Paragraph 31.

32. The '717 Patent expires on March 29, 2022. It has been valid and enforceable at all times since it issued, and remains valid and enforceable.

ANSWER: Defendants deny that the '717 patent is, or was ever, valid and enforceable. Paragraph 32 of the First Amended Complaint contains legal conclusions to which no response is required. To the extent any response is required, Defendants are without knowledge or information sufficient to form a belief as to the truth of the remaining allegations contained in Paragraph 32, and therefore deny the same.

33. The '888 Patent, entitled "Metabolically Activated Recombinant Viral Vectors and Methods for the Preparation and Use," issued on August 31, 2010 to inventor Dr. Barrie J. Carter. The '888 Patent issued from a continuation of the '717 Patent. The '888 Patent was originally assigned to Targeted Genetics Corporation, then was subsequently assigned to Genzyme Corporation. A true and correct copy of the '888 Patent is attached as Exhibit D.

ANSWER: Defendants admit that Exhibit D to the First Amended Complaint is a purported copy of the '888 patent. Defendants admit that the face of the '888 patent states that the '888 patent is titled "Metabolically Activated Recombinant Viral Vectors and Methods for their Preparation and Use"; that the '888 patent was issued by the U.S. Patent and Trademark

Office on August 31, 2010; that the '888 patent's named inventor is Barrie J. Carter; that the '888 patent issued from a continuation of U.S. Patent Application No. 10/423,507, now U.S. Patent No. 7,125,717; and that the '888 patent was assigned to Genzyme Corporation. Except as expressly admitted, Defendants deny the remaining allegations in Paragraph 33.

34. The '888 Patent expired on August 8, 2020. It was valid and enforceable under United States Patent Laws during its term and when the infringement occurred.

ANSWER: Defendants deny that the '888 patent was ever valid and enforceable. Paragraph 34 of the First Amended Complaint contains legal conclusions to which no response is required. To the extent any response is required, Defendants are without knowledge or information sufficient to form a belief as to the truth of the remaining allegations contained in Paragraph 34, and therefore deny the same.

35. The '729 Patent, entitled "Metabolically Activated Recombinant Viral Vectors and Methods for the Preparation and Use," issued on August 28, 2008 to inventor Dr. Barrie J. Carter. The '729 Patent issued from a continuation of the '888 Patent. The '729 Patent was originally assigned to Targeted Genetics Corporation, then was subsequently assigned to Genzyme Corporation. A true and correct copy of the '729 Patent is attached as Exhibit E.

ANSWER: Defendants admit that Exhibit E to the First Amended Complaint is a purported copy of the '729 patent. Defendants admit that the face of the '729 patent states that the '729 patent is titled "Metabolically Activated Recombinant Viral Vectors and Methods for their Preparation and Use"; that the '729 patent was issued by the U.S. Patent and Trademark Office on December 7, 2010; that the '729 patent's named inventor is Barrie J. Carter; that the '729 patent issued from a continuation of U.S. Patent Application No. 11/514,820; and that the '888 patent was assigned to Genzyme Corporation. Except as expressly admitted, Defendants deny the remaining allegations in Paragraph 35.

36. The '729 Patent expired on August 8, 2020. It was valid and enforceable under United States Patent Laws during its term and when the infringement occurred.

ANSWER: Defendants deny that the '729 patent was ever valid and enforceable. Paragraph 36 of the First Amended Complaint contains legal conclusions to which no response is required. To the extent any response is required, Defendants are without knowledge or information sufficient to form a belief as to the truth of the remaining allegations contained in Paragraph 36, and therefore deny the same.

37. The '054 Patent, entitled "Metabolically Activated Recombinant Viral Vectors and Methods for the Preparation and Use," issued on January 10, 2012 to inventor Barrie J. Carter. The '054 Patent issued from a continuation of the '729 Patent. The '054 Patent was originally assigned to Targeted Genetics Corporation, then was subsequently assigned to Genzyme Corporation. A true and correct copy of the '054 Patent is attached as Exhibit F.

ANSWER: Defendants admit that Exhibit F to the First Amended Complaint is a purported copy of the '054 patent. Defendants admit that the face of the '054 patent states that the '054 patent is titled "Metabolically Activated Recombinant Viral Vectors and Methods for their Preparation and Use"; that the '054 patent was issued by the U.S. Patent and Trademark Office on January 10, 2012; that the '054 patent's named inventor is Barrie J. Carter; that the '054 patent issued from a continuation of U.S. Patent Application No. 11/890,656, now U.S. Patent No. 7,846,729; and that the '054 patent was assigned to Genzyme Corporation. Except as expressly admitted, Defendants deny the remaining allegations in Paragraph 37.

38. The '054 Patent expired on August 8, 2020. It was valid and enforceable under United States Patent Laws during its term and when the infringement occurred.

ANSWER: Defendants deny that the '054 patent was ever valid and enforceable. Paragraph 38 of the First Amended Complaint contains legal conclusions to which no response is required. To the extent any response is required, Defendants are without knowledge or information sufficient to form a belief as to the truth of the remaining allegations contained in Paragraph 38, and therefore deny the same.

39. On information and belief, Defendants had knowledge of the ’535 Patent, the ’717 Patent, the ’888 Patent, ’729 Patent, and the ’054 Patent at least as early as when Novartis Gene Therapies, Inc. entered into the license agreement with AskBio.

ANSWER: Defendants admit that AveXis knew of the ’535 patent, the ’717 patent, the ’888 patent, the ’729 patent, and the ’054 patents by May 29, 2015.

40. The ’542 Patent, entitled “Compositions and Methods to Prevent AAV Vector Aggregation,” issued on June 9, 2015. The ’542 Patent issued from U.S. Patent Application No. 12/661,553, which claims priority ultimately to U.S. Provisional Patent Application No. 60/575,997 filed on June 1, 2004 and U.S. Provisional Patent Application No. 60/639,222 filed on December 22, 2004.

ANSWER: Defendants admit that the face of the ’542 patent states that the ’542 patent is titled “Compositions and Methods to Prevent AAV Vector Aggregation”; that the ’542 patent was issued by the U.S. Patent and Trademark Office on June 9, 2015; that the ’542 patent issued from U.S. Patent Application No. 12/661,553 and that it claims priority to U.S. Provisional Patent Application No. 60/575,997, filed on June 1, 2004 and U.S. Provisional Patent Application No. 60/639,222, filed on December 22, 2004. Except as expressly admitted, Defendants deny the remaining allegations in Paragraph 40.

41. The ’542 Patent was originally assigned to Avigen Inc., then was subsequently assigned to Genzyme Corporation. A true and correct copy of the ’542 Patent is attached as Exhibit G.

ANSWER: Defendants admit that Exhibit G to the First Amended Complaint is a purported copy of the ’542 patent. Defendants admit that the face of the ’542 patent states that the ’542 patent was assigned to Genzyme Corporation. Defendants are without knowledge or information sufficient to form a belief as to the truth of the remaining allegations contained in Paragraph 41, and therefore deny the same.

42. The ’542 Patent expires on June 1, 2025. It has been valid and enforceable at all times since it issued, and remains valid and enforceable.

ANSWER: Defendants deny that the '542 patent is, or was ever, valid and enforceable. Defendants are without knowledge or information sufficient to form a belief as to the truth of the remaining allegations contained in Paragraph 42, and therefore deny the same.

Count I: Infringement of U.S. Patent No. 6,596,535

43. Plaintiffs repeat and reallege the allegations set forth in paragraphs 1 through 42 above as though fully set forth herein.

ANSWER: In response to Paragraph 43 of the First Amended Complaint, Defendants repeat and reallege by reference their responses to Paragraphs 1 through 42 of the First Amended Complaint as if fully set forth herein.

44. On information and belief, Defendants' commercial manufacture, importation, use, offer to sell, or sale of Zolgensma® infringes one or more claims of the '535 Patent, including but not limited to claim 1, under 35 U.S.C. § 271(a).

ANSWER: Defendants deny the allegations in Paragraph 44.

45. Although the '535 Patent expired on August 8, 2020, prior to expiry Defendants infringed the '535 Patent in violation of 35 U.S.C. § 271(a) at least by making, using, and/or selling Zolgensma® in the United States.

ANSWER: Defendants deny the allegations in Paragraph 45.

46. On information and belief, Defendants' pre-expiration manufacture, use, and/or sale of Zolgensma® infringed at least claim 1 of the '535 Patent.

ANSWER: Defendants deny the allegations in Paragraph 46.

47. The '535 patent has one independent claim, claim 1. Claim 1 recites:

> A recombinant adeno-associated virus (rAAV) vector comprising a single-stranded heterologous nucleotide sequence comprising a region which forms intrastrand base pairs such that expression of a coding region of the heterologous sequence is enhanced relative to a second rAAV vector that lacks sufficient intrastrand base pairing to enhance said expression, wherein the region which forms intrastrand base pairs is in a coding region.

ANSWER: Defendants admit the allegations in Paragraph 47.

48. On information and belief, Zolgensma® contains a rAAV vector that comprises a coding region of the *SMN* gene (i.e., a heterologous sequence) that forms intrastrand base pairs by utilizing intrastrand base pairing vector technology to increase the efficacy of the drug. *See* Exhibit A ("11. Description" ("[Zolgensma®] is a recombinant self-complementary AAV9 containing a transgene encoding the human survival motor neuron (SMN) protein.")).

ANSWER: Defendants admit that Exhibit A to the First Amended Complaint states that ZOLGENSMA® is "a recombinant self-complementary AAV9 containing a transgene encoding the human survival motor neuron (SMN) protein" and that it is "designed to deliver a copy of the gene encoding the human SMN protein." Except as expressly admitted, Defendants deny the remaining allegations in Paragraph 48.

49. Plaintiffs have suffered damages as a result of Defendants' infringement of the '535 Patent.

ANSWER: Defendants deny the allegations in Paragraph 49.

50. On information and belief, Defendants' infringement has been willful. Since having knowledge of the '535 Patent, Defendants knew or should know that their actions infringe the '535 Patent.

ANSWER: Defendants deny the allegations in Paragraph 50.

Count II: Infringement of U.S. Patent No. 7,125,717

51. Plaintiffs repeat and reallege the allegations set forth in paragraphs 1 through 50 above as though fully set forth herein.

ANSWER: In response to Paragraph 51 of the First Amended Complaint, Defendants repeat and reallege by reference their responses to Paragraphs 1 through 50 of the First Amended Complaint as if fully set forth herein.

52. On information and belief, Defendants' commercial manufacture, importation, use, offer to sell, or sale of Zolgensma® infringes one or more claims of the '717 Patent, including but not limited to claims 1 and 2, under 35 U.S.C. §§ 271(a) and/or (b).

ANSWER: Defendants deny the allegations in Paragraph 52.

53. On information and belief, Defendants' manufacture, use, and/or sale of Zolgensma® infringes at least claims 1 and 2 of the '717 Patent.

ANSWER: Defendants deny the allegations in Paragraph 53.

54. On information and belief, Defendants have induced infringement of the '717 Patent of at least claim 1 of the '717 Patent under 35 U.S.C. § 271(b). Defendants knew of the '717 Patent, and that their conduct and communications induces users of Zolgensma® to directly infringe the '717 Patent. For instance, by means of the Zolgensma® label provided by Defendants and through other communications, Defendants instruct, direct, and encourage users of Zolgensma® and others with respect to the use of Zolgensma® with the knowledge that such use according to the label infringed the '717 Patent, intending that physicians and/or health care providers in the United States performed the directly infringing activities. On information and belief, such conduct by Defendants was intended to cause, and actually resulted in, direct infringement in the United States.

ANSWER: Defendants deny the allegations in Paragraph 54.

55. The '717 patent has two independent claims, claim 1 and claim 2. Claim 1 recites:

> A method for introducing a polynucleotide into a cell, comprising contacting the cell essentially in the absence of an AAV helper virus with a recombinant adeno-associated virus (rAAV) particle comprising an rAAV vector under conditions that allow uptake of the rAAV vector, whereby the rAAV vector is introduced into the cell, wherein the rAAV vector comprises a single-stranded heterologous nucleotide sequence comprising a coding region which forms intrastrand base pairs such that expression of the coding region of the heterologous sequence is enhanced relative to a second rAAV vector that lacks sufficient intrastrand base pairing to enhance said expression, wherein the rAAV vector comprises one or more inverted terminal repeat (ITR) sequence flanking said heterologous sequence

ANSWER: Defendants admit the allegations in Paragraph 55.

56. Claim 2 recites:

> A method for expressing a polynucleotide coding region in a cell, comprising subjecting the cell to conditions which allow expression of the coding region, whereby the coding region is expressed, wherein the polynucleotide coding region is introduced into the cell by contacting the cell essentially in the absence of an AAV helper virus with an rAAV particle comprising an rAAV vector, wherein the rAAV vector comprises a single-stranded heterologous nucleotide sequence comprising the coding region which forms intrastrand base pairs such that expression of the coding region of the heterologous sequence is enhanced relative to a second rAAV vector that lacks sufficient intrastrand base pairing to enhance

> said expression, wherein the rAAV vector comprises one or more inverted terminal repeat (ITR) sequences flanking said heterologous sequence.

ANSWER: Defendants admit the allegations in Paragraph 56.

57. On information and belief, Zolgensma® contains a functional copy of the *SMN* gene (i.e., a heterologous sequence) packaged in rAAV9. On information and belief, Zolgensma® contains a rAAV vector that contains a coding region of the *SMN* gene that forms intrastrand base pairs by utilizing intrastrand base pairing vector technology to increase the efficacy of the drug. *See* Exhibit A ("11. Description."). On information and belief, Zolgensma® contains a rAAV vector that contains one or more ITR sequences flanking the *SMN* sequence.

ANSWER: Defendants admit that Exhibit A to the First Amended Complaint states that ZOLGENSMA® is "a recombinant self-complementary AAV9 containing a transgene encoding the human survival motor neuron (SMN) protein" and that it is "designed to deliver a copy of the gene encoding the human SMN protein." Paragraph 57 of the First Amended Complaint contains legal conclusions to which no response is required. To the extent any response is required, and except as expressly admitted, Defendants deny the remaining allegations in Paragraph 57.

58. On information and belief, when administered to a patient, Zolgensma® delivers a copy of the coding region of the *SMN* gene to a cell where the SMN protein is expressed. On information and belief, Zolgensma® is administered without a helper virus.

ANSWER: Defendants admit that Exhibit A to the First Amended Complaint states that ZOLGENSMA® is "designed to deliver a copy of the gene encoding the human SMN protein." Defendants admit that ZOLGENSMA® is administered without a helper virus. Except as expressly admitted, Defendants deny the remaining allegations in Paragraph 58.

59. Plaintiffs have suffered damages as a result of Defendants' infringement of the '717 Patent and will continue to suffer damages as long as those infringing activities continue.

ANSWER: Defendants deny the allegations in Paragraph 59.

60. On information and belief, Defendants' infringement has been willful. Since having knowledge of the '717 Patent, Defendants knew or should know that their actions infringe the '717 Patent.

ANSWER: Defendants deny the allegations in Paragraph 60.

Count III: Infringement of U.S. Patent No. 7,785,888

61. Plaintiffs repeat and reallege the allegations set forth in paragraphs 1 through 60 above as though fully set forth herein.

ANSWER: In response to Paragraph 61 of the First Amended Complaint, Defendants repeat and reallege by reference their responses to Paragraphs 1 through 60 of the First Amended Complaint as if fully set forth herein.

62. On information and belief, Defendants' commercial manufacture, importation, use, offer to sell, or sale of Zolgensma® infringes one or more claims of the '888 Patent, including but not limited to claim 1, under 35 U.S.C. § 271(a).

ANSWER: Defendants deny the allegations in Paragraph 62.

63. Although the '888 Patent expired on August 8, 2020, prior to expiry Defendants infringed the '888 Patent in violation of 35 U.S.C. § 271(a) at least by making, using, and/or selling Zolgensma® in the United States.

ANSWER: Defendants deny the allegations in Paragraph 63.

64. On information and belief, Defendants' pre-expiration manufacture, use, and/or sale of Zolgensma® infringed at least claim 1 of the '888 Patent.

ANSWER: Defendants deny the allegations in Paragraph 64.

65. The '888 patent has one independent claim, claim 1. Claim 1 recites:

> A recombinant adeno-associated virus (rAAV) preparation, which rAAV virus preparation is essentially free of helper virus, comprising an rAAV particle, wherein the rAAV particle comprises an rAAV genome, wherein the rAAV genome comprises a heterologous nucleotide sequence comprising a coding region and one or more inverted terminal repeat (ITR) sequences flanking said heterologous sequence, wherein the total amount of unique sequence present in the heterologous sequence is about one-half of the heterologous sequence and wherein the heterologous sequence forms intrastrand base pairs along most or all of its length such that expression of the coding region is enhanced relative to an rAAV vector that lacks sufficient intrastrand base pairing to enhance expression.

ANSWER: Defendants admit the allegations in Paragraph 65.

66. On information and belief, Zolgensma® contains a functional copy of the *SMN* gene (i.e., a heterologous sequence) packaged in AAV9. On information and belief, Zolgensma® contains a rAAV vector that contains a rAAV genome and a coding region of the *SMN* gene that forms intrastrand base pairs by utilizing intrastrand base pairing vector technology to increase the efficacy of the drug. *See* Exhibit A ("11. Description."). On information and belief, Zolgensma® contains a rAAV vector that contains one or more ITR sequences flanking the *SMN* sequence.

ANSWER: Defendants admit that Exhibit A to the First Amended Complaint states that ZOLGENSMA® is "a recombinant self-complementary AAV9 containing a transgene encoding the human survival motor neuron (SMN) protein" and that it is "designed to deliver a copy of the gene encoding the human SMN protein." Paragraph 66 of the First Amended Complaint contains legal conclusions to which no response is required. To the extent any response is required, and except as expressly admitted, Defendants deny the remaining allegations in Paragraph 66.

67. On information and belief, Zolgensma® does not contain a helper virus.

ANSWER: Defendants admit ZOLGENSMA® does not contain a helper virus.

68. Plaintiffs have suffered damages as a result of Defendants' infringement of the '888 Patent.

ANSWER: Defendants deny the allegations in Paragraph 68.

69. On information and belief, Defendants' infringement has been willful. Since having knowledge of the '888 Patent, Defendants knew or should know that their actions infringe the '888 Patent.

ANSWER: Defendants deny the allegations in Paragraph 69.

Count IV: Infringement of U.S. Patent No. 7,846,729

70. Plaintiffs repeat and reallege the allegations set forth in paragraphs 1 through 69 above as though fully set forth herein.

ANSWER: In response to Paragraph 70, Defendants repeat and reallege by reference their responses to Paragraphs 1 through 69 of the First Amended Complaint as if fully set forth herein.

71. On information and belief, Defendants' commercial manufacture, importation, use, offer to sell, or sale of Zolgensma® infringes one or more claims of the '729 Patent, including but not limited to claim 1, under 35 U.S.C. § 271(a).

ANSWER: Defendants deny the allegations in Paragraph 71.

72. Although the '729 Patent expired on August 8, 2020, prior to expiry Defendants infringed the '729 Patent in violation of 35 U.S.C. § 271(a) at least by making, using, and/or selling Zolgensma® in the United States.

ANSWER: Defendants deny the allegations in Paragraph 72.

73. On information and belief, Defendants' pre-expiration manufacture, use, and/or sale of Zolgensma® infringed at least claim 1 of the '729 Patent.

ANSWER: Defendants deny the allegations in Paragraph 73.

74. The '729 patent has one independent claim, claim 1. Claim 1 recites:

> A method for preparing a recombinant adeno-associated virus (rAAV), the method comprising:
>
> 1) incubating a host cell under conditions that allow AAV replication and encapsidation, wherein said host cell comprises:
>
> (a) a rAAV vector comprising a heterologous nucleotide sequence and one or more AAV inverted terminal repeat (ITR) sequences flanking said heterologous sequence, wherein the vector is less than about 2.5 kb, and
>
> (b) AAV rep function, AAV cap function, and helper virus function for AAV; and
>
> 2) purifying rAAV particles produced from the host cell, wherein the rAAV particles comprise a rAAV genome which forms intrastrand base pairs along its length, such that expression of a coding region of the heterologous sequence is enhanced relative to a rAAV vector that lacks sufficient intrastrand base pairing to enhance said expression

ANSWER: Defendants admit the allegations in Paragraph 74.

75. On information and belief, Zolgensma® has been and is prepared using a host cell under conditions that allow AAV replication and encapsidation and then purifying the rAAV particles produced from the host cell to select for rAAV particles containing vectors encoding the *SMN* transgene.

ANSWER: Defendants admit that ZOLGENSMA® has been and is prepared using a host cell under conditions that allow AAV replication and encapsidation followed by purification. Except as expressly admitted, Defendants deny the remaining allegations in Paragraph 75.

76. On information and belief, Zolgensma® contains a functional copy of the *SMN* gene (i.e., a heterologous sequence) packaged in rAAV9. On information and belief, Zolgensma® contains a rAAV vector that contains a rAVV genome and a coding region of the *SMN* gene that forms intrastrand base pairs along its length by utilizing intrastrand base pairing vector technology to increase the efficacy of the drug. *See* Exhibit A ("11. Description."). On information and belief, Zolgensma® contains a rAAV vector that contains one or more ITR sequences flanking the *SMN* sequence.

ANSWER: Defendants admit that Exhibit A to the First Amended Complaint states that ZOLGENSMA® is "a recombinant self-complementary AAV9 containing a transgene encoding the human survival motor neuron (SMN) protein" and that it is "designed to deliver a copy of the gene encoding the human SMN protein." Paragraph 76 of the First Amended Complaint contains legal conclusions to which no response is required. To the extent any response is required, and except as expressly admitted, Defendants deny the remaining allegations in Paragraph 76.

77. On information and belief, Zolgensma® contains a rAAV vector that is less than about 2.5 kb.

ANSWER: Defendants admit that ZOLGENSMA® contains an rAAV vector construct that is less than about 2.5 kb.

78. Plaintiffs have suffered damages as a result of Defendants' infringement of the '729 Patent.

ANSWER: Defendants deny the allegations in Paragraph 78.

79. On information and belief, Defendants' infringement has been willful. Since having knowledge of the '729 Patent, Defendants knew or should know that their actions infringe the '729 Patent.

ANSWER: Defendants deny the allegations in Paragraph 79.

Count V: Infringement of U.S. Patent No. 8,093,054

80. Plaintiffs repeat and reallege the allegations set forth in paragraphs 1 through 79 above as though fully set forth herein.

ANSWER: In response to Paragraph 80 of the First Amended Complaint, Defendants repeat and reallege by reference its responses to Paragraphs 1 through 79 of the First Amended Complaint as if fully set forth herein.

81. On information and belief, Defendants' commercial manufacture, importation, use, offer to sell, or sale of Zolgensma® infringes one or more claims of the '054 Patent, including but not limited to claims 1 and 19, under 35 U.S.C. §§ 271(a) and/or (b).

ANSWER: Defendants deny the allegations in Paragraph 81.

82. Although the '054 Patent expired on August 8, 2020, prior to expiry Defendants infringed the '054 Patent in violation of 35 U.S.C. § 271(a) at least by making, using, and/or selling Zolgensma® in the United States.

ANSWER: Defendants deny the allegations in Paragraph 82.

83. On information and belief, Defendants' pre-expiration manufacture, use, and/or sale of Zolgensma® infringed at least claims 1 and 19 of the '054 Patent.

ANSWER: Defendants deny the allegations in Paragraph 83.

84. On information and belief, Defendants have induced infringement prior to the expiry of the '054 Patent of at least claim 1 of the '054 Patent under 35 U.S.C. § 271(b). Defendants knew of the '054 Patent, and that their conduct and communications induced users of Zolgensma® to directly infringe the '054 Patent. For instance, by means of the Zolgensma® label provided by Defendants and through other communications, Defendants instructed, directed, and encouraged users of Zolgensma® and others with respect to the use of Zolgensma® with the knowledge that such use according to the label infringed the '054 Patent, intending that physicians and/or health care providers in the United States performed the directly infringing activities. On information and belief, such conduct by Defendants was intended to cause, and actually resulted in, direct infringement in the United States.

ANSWER: Defendants deny the allegations in Paragraph 84.

85. The '054 patent has two independent claims, claim 1 and claim 19. Claim 1 recites:

> A composition comprising a purified recombinant adeno-associated virus (rAAV) particle comprising an AAV capsid and a single-stranded rAAV vector genome, wherein the rAAV vector

> genome comprises in the 5′ to 3′ direction: a 5′ AAV inverted terminal repeat (ITR) sequence, a first heterologous nucleotide sequence, an internal AAV ITR sequence, a second heterologous nucleotide sequence, and a 3′ AAV ITR sequence, wherein the first heterologous nucleotide sequence can form intrastrand base pairs with the second nucleotide sequence along most or all of its length.

ANSWER: Defendants admit the allegations in Paragraph 85.

86. Claim 19 recites:

> A method of expressing a polynucleotide coding sequence in a cell, comprising subjecting the cell to conditions which allow expression of the coding sequence, wherein the coding sequence is introduced into the cell by contacting the cell essentially in the absence of an AAV helper virus with a composition comprising a purified recombinant adeno-associated virus (rAAV) particle, wherein the rAAV particle comprises an AAV capsid and a single-stranded rAAV vector genome, wherein the rAAV vector genome comprises in the 5′ to 3′ direction: a 5′ AAV inverted terminal repeat (ITR) sequence, a first heterologous nucleotide sequence, an internal AAV ITR sequence, a second heterologous nucleotide sequence, and a 3′ AAV ITR sequence, wherein the first heterologous nucleotide sequence can form intrastrand base pairs with the second nucleotide sequence along most or all of its length, and wherein the first or the second heterologous nucleotide comprises the coding sequence.

ANSWER: Defendants admit the allegations in Paragraph 86.

87. On information and belief, Zolgensma® contains a functional copy of the *SMN* gene (i.e., a heterologous sequence) packaged in rAAV9. On information and belief, Zolgensma® contains a single-stranded rAAV vector genome that contains a coding region of the *SMN* gene that forms intrastrand base pairs by utilizing intrastrand base pairing vector technology to increase the efficacy of the drug. *See* Exhibit A ("11. Description."). On information and belief, Zolgensma® contains an AAV capsid. On information and belief, Zolgensma® contains a rAAV vector that contains one or more ITR sequences flanking the *SMN* sequence.

ANSWER: Defendants admit that Exhibit A to the First Amended Complaint states that ZOLGENSMA® is "a recombinant self-complementary AAV9 containing a transgene encoding the human survival motor neuron (SMN) protein" and that it is "designed to deliver a copy of the gene encoding the human SMN protein." Defendants admit that ZOLGENSMA® includes a capsid shell. Paragraph 87 of the First Amended Complaint contains legal conclusions to which

no response is required. To the extent any response is required, and except as expressly admitted, Defendants deny the remaining allegations in Paragraph 87.

88. On information and belief, Zolgensma® does not contain a helper virus.

ANSWER: Defendants admit ZOLGENSMA® does not contain a helper virus.

89. On information and belief, when administered to a patient, Zolgensma® delivers a copy of the *SMN* gene to a motor neuron cell where the SMN protein is expressed.

ANSWER: Defendants admit that Exhibit A to the First Amended Complaint states that ZOLGENSMA® is "designed to deliver a copy of the gene encoding the human SMN protein." Except as expressly admitted, Defendants deny the remaining allegations in Paragraph 89.

90. Plaintiffs have suffered damages as a result of Defendants' infringement of the '054 Patent.

ANSWER: Defendants deny the allegations in Paragraph 90.

91. On information and belief, Defendants' infringement has been willful. Since having knowledge of the '054 Patent, Defendants knew or should know that their actions infringe the '054 Patent.

ANSWER: Defendants deny the allegations in Paragraph 91.

Count VI: Infringement of U.S. Patent No. 9,051,542

92. Plaintiffs repeat and reallege the allegations set forth in paragraphs 1 through 91 above as though fully set forth herein.

ANSWER: In response to Paragraph 92 of the First Amended Complaint, Defendants repeat and reallege by reference their responses to Paragraphs 1 through 91 of the First Amended Complaint as if fully set forth herein.

93. On information and belief, Defendants' commercial manufacture, importation, use, offer to sell, or sale of Zolgensma® infringes one or more claims of the '542 Patent, including but not limited to claim 1, under 35 U.S.C. § 271(a).

ANSWER: Defendants deny the allegations in Paragraph 93.

94. On information and belief, Defendants' manufacture, use, and/or sale of Zolgensma® infringes at least claim 1 of the '542 Patent.

ANSWER: Defendants deny the allegations in Paragraph 94.

95. The '542 Patent has one independent claim, claim 1. Claim 1 recites:

> A composition for the storage of purified, recombinant adeno-associated virus (AAV) vector particles, comprising:
>
> purified, recombinant AAV vector particles at a concentration exceeding 1×10^{13} vg/ml up to 6.4×10^{13} vg/ml;
>
> a pH buffer, wherein the pH of the composition is between 7.5 and 8.0;
>
> and
>
> excipients comprising one or more multivalent ions selected from the group consisting of citrate, sulfate, magnesium, and phosphate; wherein the ionic strength of the composition is greater than 200 mM, and wherein the purified AAV vector particles are stored in the composition without significant aggregation.

ANSWER: Defendants admit the allegations in Paragraph 95.

96. On information and belief, Zolgensma® is provided as a composition for the storage of purified, recombinant adeno-associated virus (AAV) vector particles having a formulation as recited in claim 1 of the '542 Patent. In particular, on information and belief, the Zolgensma® suspension contains purified, recombinant adeno-associated virus (AAV) vector particles in a concentration exceeding 1×10^{13} vg/ml up to 6.4×10^{13} vg/ml, a pH buffer, wherein the pH of the composition is between 7.5 and 8.0, and excipients comprising one or more multivalent ions selected from the group consisting of citrate, sulfate, magnesium, and phosphate, wherein the ionic strength of the composition is greater than 200 mM. *See* Exhibit A ("11. Description," stating that "ZOLGENSMA has a nominal concentration of 2.0×10^{13} vg/mL. Each vial contains an extractable volume of not less than either 5.5 mL or 8.3 mL and the excipients 20 mM Tris (pH 8.0), 1 mM magnesium chloride ($MgCl_2$), 200 mM sodium chloride (NaCl) and 0.005% poloxamer 188. ZOLGENSMA is packaged as a sterile suspension and contains no preservative.").

ANSWER: Defendants admit that Exhibit A to the First Amended Complaint states that ZOLGENSMA® "is a suspension of adeno-associated viral vector-based gene therapy for intravenous infusion" and that it "has a nominal concentration of 2.0 X 10^{13} vg/mL. Each vial contains an extractable volume of not less than either 5.5 mL or 8.3 mL and the excipients 20 mM Tris (pH 8.0), 1 mM magnesium chloride ($MgCl_2$), 200 mM sodium chloride (NaCl) and

0.005% poloxamer 188. ZOLGENSMA® is packaged as a sterile suspension and contains no preservative." Paragraph 96 of the First Amended Complaint contains legal conclusions to which no response is required. To the extent any response is required, and except as expressly admitted, Defendants deny the remaining allegations in Paragraph 96.

97. On information and belief, the Zolgensma® suspension is stored without significant aggregation. *See* Exhibit A ("2.2 Preparation" stating, "When thawed, ZOLGENSMA is a clear to slightly opaque, colorless to faint white liquid, free of particles.").

ANSWER: Defendants admit that Exhibit A to the First Amended Complaint states "[w]hen thawed, ZOLGENSMA is a clear to slightly opaque, colorless to faint white liquid, free of particles." Paragraph 97 of the First Amended Complaint contains legal conclusions to which no response is required. To the extent any response is required, and except as expressly admitted, Defendants deny the remaining allegations in Paragraph 97.

98. Plaintiffs have suffered damages as a result of Defendants' infringement of the '542 Patent.

ANSWER: Defendants deny the allegations in Paragraph 98.

PRAYER FOR RELIEF

Defendants incorporate by reference their responses to Paragraphs 1 through 98 of the First Amended Complaint and deny that Plaintiffs are entitled to any relief or judgment whatsoever from Defendants or the Court, either as prayed for in the First Amended Complaint or otherwise.

GENERAL DENIAL AND NON-WAIVER

Defendants further deny each and every allegation contained in the First Amended Complaint that is not specifically admitted, denied, or otherwise responded to in this Answer. The failure to deny a specific allegation, or assert a specific defense, shall not be deemed an admission of an allegation or a waiver of a defense.

DEFENSES

Without prejudice to the denials set forth in its Answer, and without admitting any allegation of the First Amended Complaint not expressly admitted herein, Defendants assert the following separate defenses to the First Amended Complaint without assuming the burden of proof on any such defense that would otherwise rest with Plaintiffs. Defendants expressly reserve their rights to assert additional defenses that discovery may reveal.

First Defense: Non-Infringement of U.S. Patent No. 6,596,535

Defendants have not infringed any valid or enforceable claim of the ’535 patent either directly or indirectly, and either literally or under the doctrine of equivalents.

Second Defense: Invalidity of U.S. Patent No. 6,596,535

One or more claims of the ’535 patent were and are invalid for failure to meet one or more conditions for patentability specified in Title 35 of the United States Code, including, but not limited to, 35 U.S.C. §§ 102, 103, and/or 112, and/or judicially created doctrines of invalidity.

Third Defense: Non-Infringement of U.S. Patent No. 7,125,717

Defendants have not infringed, do not infringe, and would not infringe any valid or enforceable claim of the ’717 patent either directly or indirectly, and either literally or under the doctrine of equivalents.

Fourth Defense: Invalidity of U.S. Patent No. 7,125,717

One or more claims of the ’717 patent were and are invalid for failure to meet one or more conditions for patentability specified in Title 35 of the United States Code, including, but not limited to, 35 U.S.C. §§ 102, 103, and/or 112, and/or judicially created doctrines of invalidity.

Fifth Defense: Non-Infringement of U.S. Patent No. 7,785,888

Defendants have not infringed any valid or enforceable claim of the '888 patent either directly or indirectly, and either literally or under the doctrine of equivalents.

Sixth Defense: Invalidity of U.S. Patent No. 7,785,888

One or more claims of the '888 patent were and are invalid for failure to meet one or more conditions for patentability specified in Title 35 of the United States Code, including, but not limited to, 35 U.S.C. §§ 102, 103, and/or 112, and/or judicially created doctrines of invalidity.

Seventh Defense: Non-Infringement of U.S. Patent No. 7,846,729

Defendants have not infringed any valid or enforceable claim of the '729 patent either directly or indirectly, and either literally or under the doctrine of equivalents.

Eighth Defense: Invalidity of U.S. Patent No. 7,846,729

One or more claims of the '729 patent were and are invalid for failure to meet one or more conditions for patentability specified in Title 35 of the United States Code, including, but not limited to, 35 U.S.C. §§ 102, 103, and/or 112, and/or judicially created doctrines of invalidity.

Ninth Defense: Non-Infringement of U.S. Patent No. 8,093,054

Defendants have not infringed any valid or enforceable claim of the '054 patent either directly or indirectly, and either literally or under the doctrine of equivalents.

Tenth Defense: Invalidity of U.S. Patent No. 8,093,054

One or more claims of the '054 patent were and are invalid for failure to meet one or more conditions for patentability specified in Title 35 of the United States Code, including, but

not limited to, 35 U.S.C. §§ 102, 103, and/or 112, and/or judicially created doctrines of invalidity.

Eleventh Defense: Non-Infringement of U.S. Patent No. 9,051,542

Defendants have not infringed, do not infringe, and would not infringe any valid or enforceable claim of the ’542 patent either directly or indirectly, and either literally or under the doctrine of equivalents.

Twelfth Defense: Invalidity of U.S. Patent No. 9,051,542

One or more claims of the ’542 patent were and are invalid for failure to meet one or more conditions for patentability specified in Title 35 of the United States Code, including, but not limited to, 35 U.S.C. §§ 102, 103, and/or 112, and/or judicially created doctrines of invalidity.

Thirteenth Defense: Failure to State a Claim

The First Amended Complaint fails to state a claim upon which relief may be granted as to each of NGT, NPC, and Novartis AG and should be dismissed as to each under Fed. R. Civ. P. 12(b)(6).

Fourteenth Defense: No Willful Infringement

Defendants have not willfully infringed any claim of the Asserted Patents.

Fifteenth Defense: Safe Harbor

Plaintiffs’ claims that Defendants have infringed each of the Asserted Patents are barred by the safe harbor of 35 U.S.C. § 271(e)(1).

Sixteenth Defense: Lack of Personal Jurisdiction

The Court lacks personal jurisdiction over Novartis AG, a corporation that is organized and exists under the laws of Switzerland.

Seventeenth Defense: Prosecution History Estoppel

Any claim of relief by Plaintiffs is barred, in whole or in part, by prosecution history estoppel.

Eighteenth Defense: Lack of Ownership and Standing

Upon information and belief, Defendants do not own, exclusively license, and/or hold all substantial rights of, the '535, '717, '888, '729, '054, and '542 patents, and therefore do not meet the definition of patentee under 35 U.S.C. § 281 and additionally lack standing to bring the present litigation.

Nineteenth Reservation of Defenses and Counterclaims

Defendants reserve all defenses available under the Federal Rules of Civil Procedure, the Patent Laws of the United States, and any other defenses or counterclaims that may now or in the future be available based on discovery or any other factual investigation concerning this case, including that Plaintiffs have failed to aver any facts supporting the conclusion that they have suffered any irreparable injury or harm under 35 U.S.C. § 283, and that Plaintiffs have failed to aver any facts supporting that this is an exceptional case and/or an award of attorney's fees under 35 U.S.C. § 285.

COUNTERCLAIMS

For its counterclaims against Genzyme Corporation ("Genzyme") and Aventis Inc. ("Aventis") (collectively, "Counterclaim-Defendants"), Counterclaim-Plaintiffs Novartis Gene Therapies, Inc. ("NGT") and Novartis Pharmaceuticals Corporation ("NPC") (collectively, "Counterclaim-Plaintiffs") state as follows:

THE PARTIES

1. Counterclaim-Plaintiff NGT is a Delaware Corporation that has its principal place of business at 2275 Half Day Road, Suite 200, Bannockburn, IL 60015.

2. Counterclaim-Plaintiff NPC is a Delaware Corporation that has its principal place of business at One Health Plaza, East Hanover, New Jersey 07936.

3. Upon information and belief, Counterclaim-Defendant Genzyme is a corporation organized and existing under the laws of the Commonwealth of Massachusetts, having its principal place of business at 50 Binney Street, Cambridge, Massachusetts 02142.

4. Upon information and belief, Counterclaim-Defendant Aventis is a corporation organized and existing under the laws of the State of Delaware with its principal place of business at 55 Corporate Drive, Bridgewater, New Jersey 08807. Upon information and belief, Genzyme is a wholly-owned subsidiary of Aventis.

JURISDICTION AND VENUE

5. These counterclaims arise under the Patent Laws of the United States and the Declaratory Judgment Act, 28 U.S.C. §§ 2201 and 2202.

6. This Court has jurisdiction over the subject matter of this action pursuant to 28 U.S.C. §§ 1331 and 1338(a) and the Declaratory Judgment Act, 28 U.S.C. §§ 2201 and 2202.

7. This Court has personal jurisdiction over Counterclaim-Defendants at least because Counterclaim-Defendants have availed themselves of the rights and privileges of this forum by bringing this civil action in this judicial district.

8. Venue is proper in this judicial district under 28 U.S.C. §§ 1391(b) and (c), at least because Counterclaim-Defendants filed this civil action in this judicial district.

FACTUAL BACKGROUND

Novartis's SMA Treatment: ZOLGENSMA®

9. Spinal Muscular Atrophy ("SMA") is a genetic disorder caused by a lack of a functional *SMN1* gene. The lack of a functional *SMN1* gene results in a loss of specialized nerve cells, called motor neurons, that control motor function. The extent to which a patient loses motor function varies across types of SMA, which can be classified into types 1 through 4.

10. Type 1 is the most severe type of SMA and affects about 60% of SMA patients. The incidence of SMA is approximately 1 in 10,000 live births, and it is the leading genetic cause of infant death. The onset of symptoms for Type 1 can begin at birth and diagnosis generally occurs in the first six months of an infant's life.

11. Individuals with Type I SMA experience irreversible loss of motor neurons which results in difficulty breathing, swallowing, poor head control, and worsening muscle weakness. If left untreated, 90% of cases result in the death or need for permanent ventilation of the child by the age of two.

12. ZOLGENSMA® (onasemnogene abeparvovac-xioi) was initially developed by AveXis, Inc. ("AveXis"). AveXis's original research on onasemnogene abeparvovac-xioi dates back over a decade, with IND submission occurring in August 2013. The FDA granted Fast

Track designation to the drug in September 2013, and Orphan Drug designation a year later in September 2014. The drug received a Breakthrough Therapy designation in July 2016.

13. On April 9, 2018, Novartis AG announced that it had entered into an agreement to acquire AveXis. On May 15, 2018, the transaction closed and AveXis became a wholly-owned indirect subsidiary of Novartis AG. AveXis was later renamed, on September 2, 2020, Novartis Gene Therapies Inc.

14. In August 2018, onasemnogene abeparvovac-xioi was granted a Rare Pediatric Disease priority review voucher.

15. On October 1, 2018, AveXis (now known as NGT) submitted the Biologics License Application (BLA) for onasemnogene abeparvovac-xioi. On December 3, 2018, Novartis announced the FDA had accepted the BLA and granted it priority review.

16. On May 24, 2019, ZOLGENSMA® (onasemnogene abeparvovac-xioi) was approved by the FDA as the first gene-replacement therapy for SMA, and more generally, the first gene therapy that treats a neuromuscular disorder. In an FDA press release, the FDA Commissioner described the approval of ZOLGENSMA® as "another milestone in the transformational power of gene and cell therapies."

17. ZOLGENSMA® is a one-time intravenous infusion indicated for the treatment of pediatric patients less than 2 years of age with spinal muscular atrophy (SMA) with bi-allelic mutations in the *survival motor neuron 1 (SMN1)* gene. It delivers the *SMN* gene using an adeno-associated virus (AAV) vector. By delivering a functional *SMN* gene, ZOLGENSMA® helps patients produce sufficient levels of the SMN protein necessary to improve motor neuron function.

18. ZOLGENSMA® has saved the lives of children living with SMA. Without treatment, SMA Type 1 leads to death or permanent ventilation by the age of two in the majority of cases, and children with SMA Type 2 never walk. ZOLGENSMA® is a transformative therapy that, when administered prior to the onset of symptoms, allows children to achieve milestones like sitting, standing and walking at an appropriate age, to grow as expected without nutritional assistance, and to remain free of all forms of mechanical ventilatory support.

COUNT I
(Declaratory Judgment of Non-Infringement of the '535 Patent)

19. Counterclaim-Plaintiffs repeat and incorporate by reference the allegations contained in Paragraphs 1-18 as though fully set forth herein.

20. Upon information and belief, on or about July 22, 2003, United States Patent and Trademark Office ("USPTO") issued U.S. Patent No. 6,596,535 ("the '535 patent"), titled "Metabolically Activated Recombinant Viral Vectors and Methods for the Preparation and Use," to assignee Targeted Genetics Corporation. In this action, Genzyme and Aventis have pled that Genzyme is the owner of the '535 patent.

21. Counterclaim-Defendants allege that the manufacture, use, and sale of recombinant adeno-associated virus vectors ("rAAV vectors") for ZOLGENSMA® infringes the '535 patent.

22. By asserting their claims against Counterclaim-Plaintiffs for infringement of the '535 patent, Counterclaim-Defendants have created an actual, substantial, and continuing justiciable case or controversy regarding the infringement of the claims of the '535 patent.

23. Counterclaim-Plaintiffs have not infringed, directly or indirectly, any valid or enforceable claim of the '535 patent.

24. For example, Counterclaim-Plaintiffs do not infringe one or more of the claims of the ’535 patent because the ’535 patent is invalid and not enforceable. One cannot be liable for infringing an invalid patent.

25. As a further example, Counterclaim-Plaintiffs do not infringe one or more of the claims of the ’535 patent because ZOLGENSMA® does not meet each and every element recited in the claims, including “[a] recombinant adeno-associated virus (rAAV) vector comprising a single-stranded heterologous nucleotide sequence comprising a region which forms intrastrand base pairs such that expression of a coding region of the heterologous sequence is enhanced…”

26. Under 28 U.S.C. §§ 2201 and 2202, Counterclaim-Plaintiffs are entitled to a declaratory judgment that they have not infringed any valid and enforceable claim of the ’535 patent.

COUNT II
(Declaratory Judgment of Invalidity of the ’535 Patent)

27. Counterclaim-Plaintiffs repeat and incorporate by reference the allegations contained in Paragraphs 1-26 as though fully set forth herein.

28. Counterclaim-Defendants allege that the manufacture, use, or sale of rAAV vectors for ZOLGENSMA® infringes the ’535 patent.

29. By asserting their claims against Counterclaim-Plaintiffs for infringement of the ’535 patent, Counterclaim-Defendants have created an actual, substantial, and continuing justiciable case or controversy regarding the validity of the claims of the ’535 patent.

30. One or more of the claims of the ’535 patent are invalid for failure to comply with one or more of the requirements for patentability set forth in Title 35 of the U.S. Code, including §§ 102, 103, and/or 112.

31. For example, one or more of the claims of the ’535 patent are invalid as anticipated and/or obvious under 35 U.S.C. §§ 102 and/or 103 over at least one or more prior art references, including Hermens (1997) Thesis chapter 7 90-9010642-1; Samulski et al. (1987) *Journal of Virology* 61:3069-3101; WO 99/11764; Dong et al. (1996) *Human Gene Therapy* 7:2101-2112; Hörster et al. (July 1999) *Gene Therapy* 6:1231-1238; Homann et al. (1993) *Nucleic Acids Research* 21:2809-2814; Phillips et al. (1997) *Hypertension* 29[part2]:374-380; Welch et al. (1998) *Clinical and Diagnostic Virology* 10:163-171; Su et al. (1996) *Human Gene Therapy* 7:463-470; Zolutukhin (1996) *J. Virol.* 70:4646-4654; WO 97/32018; WO 1999/047691; Mamounas et al. (1995) *Gene Therapy* 2:429-432; WO 97/17458; WO 95/28493; WO 95/13392; WO 95/28948; Ferrari et al. (1997) *Nature Medicine* 3(11):1295-1297; Ferrari et al. (1996) *Journal of Virology* 70(5):3227-3234; Xiao et al. (1998) *Journal of Virology* 72(3):2224-2232; Muzyczka (1992) *Current Topics in Microbiology and Immunology* 158:97-129.

32. As a further example, the ’535 patent is invalid under 35 U.S.C. § 112 for lack of written description. The specification of the ’535 patent fails to provide adequate written description to reasonably convey to those skilled in the art that the inventor had possession of the claimed subject matter, including the entire genus of rAAV vectors comprising “a single-stranded heterologous nucleotide sequence comprising a region which forms intrastrand base pairs such that expression of a coding region of the heterologous sequence is enhanced relative to a second rAAV vector that lacks sufficient intrastrand base pairing to enhance said expression.”

33. As a further example, the ’535 patent is invalid under 35 U.S.C. § 112 for lack of enablement. The specification of the ’535 patent fails to enable a person of ordinary skill to make and use the full scope of the claims without undue experimentation, including the entire genus of

rAAV vectors comprising "a single-stranded heterologous nucleotide sequence comprising a region which forms intrastrand base pairs such that expression of a coding region of the heterologous sequence is enhanced relative to a second rAAV vector that lacks sufficient intrastrand base pairing to enhance said expression."

34. As a further example, the '535 patent is invalid under 35 U.S.C. § 112 for indefiniteness. The specification of the '535 patent fails to inform, with reasonable certainty, the scope of the invention, thus making it indefinite, including the meaning of "a region which forms intrastrand base pairs such that expression of a coding region of the heterologous sequence is enhanced relative to a second rAAV vector that lacks sufficient intrastrand base pairing to enhance said expression."

35. Under 28 U.S.C. §§ 2201 and 2202, Counterclaim-Plaintiffs are entitled to a declaratory judgment that the claims of the '535 patent are invalid for failure to comply with one or more of the requirements for patentability set forth in Title 35 of the U.S. Code, including §§ 102, 103, and/or 112.

COUNT III
(Declaratory Judgment of Non-Infringement of the '717 Patent)

36. Counterclaim-Plaintiffs repeat and incorporate by reference the allegations contained in Paragraphs 1-35 as though fully set forth herein.

37. Upon information and belief, on or about October 24, 2006, the USPTO issued U.S. Patent No. 7,125,717 ("the '717 patent"), titled "Metabolically Activated Recombinant Viral Vectors and Methods for their Preparation and Use," to assignee Targeted Genetics Corporation. In this action, Genzyme has pled that it is the owner of the '717 patent.

38. Counterclaim-Defendants allege that the manufacture, use, or sale of rAAV vectors for ZOLGENSMA® infringes the '717 patent.

39. By asserting their claims against Counterclaim-Plaintiffs for infringement of the '717 patent, Counterclaim-Defendants have created an actual, substantial, and continuing justiciable case or controversy regarding the infringement of the claims of the '717 patent.

40. Counterclaim-Plaintiffs have not infringed, do not infringe, and would not, if the gene therapy drug ZOLGENSMA® were marketed, infringe, directly or indirectly, any valid or enforceable claim of the '717 patent.

41. For example, Counterclaim-Plaintiffs do not infringe one or more of the claims of the '717 patent because the '717 is invalid and not enforceable. One cannot be liable for infringing an invalid patent.

42. As a further example, Counterclaim-Plaintiffs do not infringe one or more of the claims of the '717 patent because ZOLGENSMA® does not meet each and every element recited in the claims, including an rAAV vector wherein "the rAAV vector comprises a single-stranded heterologous nucleotide sequence comprising a coding region which forms intrastrand base pairs such that expression of the coding region of the heterologous sequence is enhanced …."

43. Under 28 U.S.C. §§ 2201 and 2202, Counterclaim-Plaintiffs are entitled to a declaratory judgment that they have not infringed, do not infringe, and would not, if the gene therapy drug ZOLGENSMA® were marketed, infringe, directly or indirectly, any valid and enforceable claim of the '717 patent.

COUNT IV
(Declaratory Judgment of Invalidity of the '717 Patent)

44. Counterclaim-Plaintiffs repeat and incorporate by reference the allegations contained in Paragraphs 1-43 as though fully set forth herein.

45. Counterclaim-Defendants allege that the manufacture, use, or sale of rAAV vectors for ZOLGENSMA® infringes the '717 patent.

46. By asserting their claims against Counterclaim-Plaintiffs for infringement of the '717 patent, Counterclaim-Defendants have created an actual, substantial, and continuing justiciable case or controversy regarding the validity of the claims of the '717 patent.

47. One or more claims of the '717 patent are invalid for failure to comply with one or more of the requirements for patentability set forth in Title 35 of the U.S. Code, including §§ 102, 103, and/or 112.

48. For example, one or more of the claims of the '717 patent are invalid as anticipated and/or obvious under 35 U.S.C. §§ 102 and/or 103 over at least one or more prior art references, including Hermens (1997) Thesis chapter 7 90-9010642-1; Samulski et al. (1987) *Journal of Virology* 61:3069-3101; WO 99/11764; Dong et al. (1996) *Human Gene Therapy* 7:2101-2112; Hörster et al. (July 1999) *Gene Therapy* 6:1231-1238; Homann et al. (1993) *Nucleic Acids Research* 21:2809-2814; Phillips et al. (1997) *Hypertension* 29[part2]:374-380; Welch et al. (1998) *Clinical and Diagnostic Virology* 10:163-171; Su et al. (1996) *Human Gene Therapy* 7:463-470; Zolutukhin (1996) *J Virol* 70:4646-4654; WO 97/32018; WO 1999/047691; Mamounas et al. (1995) *Gene Therapy* 2:429-432; WO 97/17458; WO 95/28493; WO 95/13392; WO 95/28948; Ferrari et al. (1997) *Nature Medicine* 3(11):1295-1297; Ferrari et al. (1996) *Journal of Virology* 70(5):3227-3234; Xiao et al. (1998) *Journal of Virology* 72(3):2224-2232; Muzyczka (1992) *Current Topics in Microbiology and Immunology* 158:97-129.

49. As a further example, the '717 patent is invalid under 35 U.S.C. § 112 for lack of written description. The specification of the '717 patent fails to provide adequate written description to reasonably convey to those skilled in the art that the inventor had possession of the claimed subject matter, including the entire genus of rAAV vectors comprising "a single-stranded heterologous nucleotide sequence comprising a coding region which forms intrastrand

base pairs such that expression of the coding region of the heterologous sequence is enhanced relative to a second rAAV vector that lacks sufficient intrastrand base pairing to enhance said expression."

50. As a further example, the '717 patent is invalid under 35 U.S.C. § 112 for lack of enablement. The specification of the '717 patent fails to enable a person of ordinary skill to make and use the full scope of the claims without undue experimentation, including the entire genus of rAAV vectors comprising "a single-stranded heterologous nucleotide sequence comprising a coding region which forms intrastrand base pairs such that expression of the coding region of the heterologous sequence is enhanced relative to a second rAAV vector that lacks sufficient intrastrand base pairing to enhance said expression."

51. As a further example, the '717 patent is invalid under 35 U.S.C. § 112 for indefiniteness. The specification of the '717 patent fails to inform, with reasonable certainty, the scope of the invention, thus making it indefinite, including the meaning of "a coding region which forms intrastrand base pairs such that expression of the coding region of the heterologous sequence is enhanced relative to a second rAAV vector that lacks sufficient intrastrand base pairing to enhance said expression."

52. Under 28 U.S.C. §§ 2201 and 2202, Counterclaim-Plaintiffs are entitled to a declaratory judgment that the claims of the '717 patent are invalid for failure to comply with one or more of the requirements for patentability set forth in Title 35 of the U.S. Code, including §§ 102, 103, and/or 112.

COUNT V
(Declaratory Judgment of Non-Infringement of the '888 Patent)

53. Counterclaim-Plaintiffs repeat and incorporate by reference the allegations contained in Paragraphs 1-52 as though fully set forth herein.

54. Upon information and belief, on or about August 31, 2010, the USPTO issued U.S. Patent No. 7,785,888 ("the '888 patent"), titled "Metabolically Activated Recombinant Viral Vectors and Methods for their Preparation and Use," to assignee Genzyme Corporation. In this action, Genzyme Corporation has pled that it is the owner of the '888 patent.

55. Counterclaim-Defendants allege that the manufacture, use, or sale of rAAV vectors for ZOLGENSMA® infringes the '888 patent.

56. By asserting their claims against Counterclaim-Plaintiffs for infringement of the '888 patent, Counterclaim-Defendants have created an actual, substantial, and continuing justiciable case or controversy regarding the infringement of the claims of the '888 patent.

57. Counterclaim-Plaintiffs have not infringed, directly or indirectly, any valid or enforceable claim of the '888 patent.

58. For example, Counterclaim-Plaintiffs do not infringe one or more of the claims of the '888 patent because the '888 patent is invalid and not enforceable. One cannot be liable for infringing an invalid patent.

59. As a further example, Counterclaim-Plaintiffs do not infringe one or more of the claims of the '888 patent because ZOLGENSMA® does not meet each and every element recited in the claims, including the heterologous sequence that "forms intrastrand base pairs along most or all of its length such that expression of the coding region is enhanced relative to an rAAV vector that lacks sufficient intrastrand base pairing to enhance expression."

60. Under 28 U.S.C. §§ 2201 and 2202, Counterclaim-Plaintiffs are entitled to a declaratory judgment that they have not infringed, directly or indirectly, any valid and enforceable claim of the '888 patent.

COUNT VI
(Declaratory Judgment of Invalidity of the '888 Patent)

61. Counterclaim-Plaintiffs repeat and incorporate by reference the allegations contained in Paragraphs 1-60 as though fully set forth herein.

62. Counterclaim-Defendants allege that the manufacture, use, or sale of rAAV vectors for ZOLGENSMA® infringes the '888 patent.

63. By asserting their claims against Counterclaim-Plaintiffs for infringement of the '888 patent, Counterclaim-Defendants have created an actual, substantial, and continuing justiciable case or controversy regarding the validity of the claims of the '888 patent.

64. One or more of the claims of the '888 patent are invalid for failure to comply with one or more of the requirements for patentability set forth in Title 35 of the U.S. Code, including §§ 102, 103, and/or 112.

65. For example, one or more claims of the '888 patent are invalid as anticipated and/or obvious under 35 U.S.C. §§ 102 and/or 103 over at least one or more prior art references, including Hermens (1997) Thesis chapter 7 90-9010642-1; Samulski et al. (1987) *Journal of Virology* 61:3069-3101; WO 99/11764; Dong et al. (1996) *Human Gene Therapy* 7:2101-2112; Hörster et al. (July 1999) *Gene Therapy* 6:1231-1238; Homann et al. (1993) *Nucleic Acids Research* 21:2809-2814; Phillips et al. (1997) *Hypertension* 29[part2]:374-380; Welch et al. (1998) *Clinical and Diagnostic Virology* 10:163-171; Su et al. (1996) *Human Gene Therapy* 7:463-470; Zolutukhin (1996) *J Virol* 70:4646-4654; WO 97/32018; WO 1999/047691; Mamounas et al. (1995) *Gene Therapy* 2:429-432; WO 97/17458; WO 95/28493; WO 95/13392; WO 95/28948; Ferrari et al. (1997) *Nature Medicine* 3(11):1295-1297; Ferrari et al. (1996) *Journal of Virology* 70(5):3227-3234; Xiao et al. (1998) *Journal of Virology* 72(3):2224-2232; Muzyczka (1992) *Current Topics in Microbiology and Immunology* 158:97-129.

66. As a further example, the ’888 patent is invalid under 35 U.S.C. § 112 for lack of written description. The specification of the ’888 patent fails to provide adequate written description to reasonably convey to those skilled in the art that the inventor had possession of the claimed subject matter, including the entire genus of rAAV vectors comprising “a heterologous nucleotide sequence…wherein the heterologous sequence forms intrastrand base pairs along most or all of its length such that expression of the coding region is enhanced relative to an rAAV vector that lacks sufficient intrastrand base pairing to enhance expression.”

67. As a further example, the ’888 patent is invalid under 35 U.S.C. § 112 for lack of enablement. The specification of the ’888 patent fails to enable a person of ordinary skill to make and use the full scope of the claims without undue experimentation, including the entire genus of rAAV vectors comprising “a heterologous nucleotide sequence…wherein the heterologous sequence forms intrastrand base pairs along most or all of its length such that expression of the coding region is enhanced relative to an rAAV vector that lacks sufficient intrastrand base pairing to enhance expression.”

68. As a further example, the ’888 patent is invalid under 35 U.S.C. § 112 for indefiniteness. The specification of the ’888 patent fails to inform, with reasonable certainty, a person of ordinary skill in the art the scope of the invention, including the meaning of “a heterologous nucleotide sequence…wherein the heterologous sequence forms intrastrand base pairs along most or all of its length such that expression of the coding region is enhanced relative to an rAAV vector that lacks sufficient intrastrand base pairing to enhance expression.”

69. Under 28 U.S.C. §§ 2201 and 2202, Counterclaim-Plaintiffs are entitled to a declaratory judgment that the claims of the ’888 patent are invalid for failure to comply with one

or more of the requirements for patentability set forth in Title 35 of the U.S. Code, including §§ 102, 103, and/or 112.

COUNT VII
(Declaratory Judgment of Non-Infringement of the '729)

70. Counterclaim-Plaintiffs repeat and incorporate by reference the allegations contained in Paragraphs 1-69 as though fully set forth herein.

71. Upon information and belief, on or about December 7, 2010, the USPTO issued U.S. Patent No. 7,846,729 ("the '729 patent"), titled "Metabolically Activated Recombinant Viral Vectors and Methods for their Preparation and Use," to assignee Genzyme Corporation. In this action, Genzyme Corporation has pled that it is the owner of the '729 patent.

72. Counterclaim-Defendants allege that the manufacture, use, or sale of rAAV vectors for ZOLGENSMA® infringes the '729 patent.

73. By asserting their claims against Counterclaim-Plaintiffs for infringement of the '729 patent, Counterclaim-Defendants have created an actual, substantial, and continuing justiciable case or controversy regarding the infringement of the claims of the '729 patent.

74. Counterclaim-Plaintiffs have not infringed, directly or indirectly, any valid or enforceable claim of the '729 patent.

75. For example, Counterclaim-Plaintiffs do not infringe one or more of the claims of the '729 patent because the '729 patent is invalid and not enforceable. One cannot be liable for infringing an invalid patent.

76. As a further example, Counterclaim-Plaintiffs do not infringe one or more of the claims of the '729 patent because ZOLGENSMA® does not meet each and every element recited in the claims, including "a rAAV vector comprising a heterologous nucleotide sequence…wherein the rAAV particles comprise a rAAV genome which forms intrastrand base

pairs along its length, such that expression of a coding region of the heterologous sequence is enhanced relative to a rAAV vector that lacks sufficient intrastrand base pairing to enhance said expression."

77. Under 28 U.S.C. §§ 2201 and 2202, Counterclaim-Plaintiffs are entitled to a declaratory judgment that they have not infringed, directly or indirectly, any valid and enforceable claim of the '729 patent.

COUNT VIII
(Declaratory Judgment of Invalidity of the '729 Patent)

78. Counterclaim-Plaintiffs repeat and incorporate by reference the allegations contained in Paragraphs 1-77 as though fully set forth herein.

79. Counterclaim-Defendants allege that the manufacture, use, or sale of rAAV vectors for ZOLGENSMA® infringes the '729 patent.

80. By asserting their claims against Counterclaim-Plaintiffs for infringement of the '729 patent, Counterclaim-Defendants have created an actual, substantial, and continuing justiciable case or controversy regarding the validity of the claims of the '729 patent.

81. The claims of the '729 patent are invalid for failure to comply with one or more of the requirements for patentability set forth in Title 35 of the U.S. Code, including §§ 102, 103, and/or 112.

82. For example, one or more of the claims of the '729 patent are invalid as anticipated and/or obvious under 35 U.S.C. §§ 102 and/or 103 over at least one or more prior art references, including Hermens (1997) Thesis chapter 7 90-9010642-1; Samulski et al. (1987) *Journal of Virology* 61:3069-3101; WO 99/11764; Dong et al. (1996) *Human Gene Therapy* 7:2101-2112; Hörster et al. (July 1999) *Gene Therapy* 6:1231-1238; Homann et al. (1993) *Nucleic Acids Research* 21:2809-2814; Phillips et al. (1997) *Hypertension* 29[part2]:374-380;

Welch et al. (1998) *Clinical and Diagnostic Virology* 10:163-171; Su et al. (1996) *Human Gene Therapy* 7:463-470; Zolutukhin (1996) *J Virol* 70:4646-4654; WO 97/32018; WO 1999/047691; Mamounas et al. (1995) *Gene Therapy* 2:429-432; WO 97/17458; WO 95/28493; WO 95/13392; WO 95/28948; Ferrari et al. (1997) *Nature Medicine* 3(11):1295-1297; Ferrari et al. (1996) *Journal of Virology* 70(5):3227-3234; Xiao et al. (1998) *Journal of Virology* 72(3):2224-2232; Muzyczka (1992) *Current Topics in Microbiology and Immunology* 158:97-129.

83. As a further example, the ’729 patent is invalid under 35 U.S.C. § 112 for lack of written description. The specification of the ’729 patent fails to provide adequate written description to reasonably convey to those skilled in the art that the inventor had possession of the claimed subject matter, including the entire genus of rAAV vectors comprising “a heterologous nucleotide sequence…wherein the rAAV particles comprise a rAAV genome which forms intrastrand base pairs along its length, such that expression of a coding region of the heterologous sequence is enhanced relative to a rAAV vector that lacks sufficient intrastrand base pairing to enhance said expression.”

84. As a further example, the ’729 patent is invalid under 35 U.S.C. § 112 for lack of enablement. The specification of the ’729 patent fails to enable a person of ordinary skill to make and use the full scope of the claims without undue experimentation, including the entire genus of rAAV vectors comprising “a heterologous nucleotide sequence…wherein the rAAV particles comprise a rAAV genome which forms intrastrand base pairs along its length, such that expression of a coding region of the heterologous sequence is enhanced relative to a rAAV vector that lacks sufficient intrastrand base pairing to enhance said expression.”

85. As a further example, the ’729 patent is invalid under 35 U.S.C. § 112 for indefiniteness. The specification of the ’729 patent fails to inform, with reasonable certainty, the

scope of the invention, thus making it indefinite, including the entire genus of rAAV vectors comprising "a heterologous nucleotide sequence…wherein the rAAV particles comprise a rAAV genome which forms intrastrand base pairs along its length, such that expression of a coding region of the heterologous sequence is enhanced relative to a rAAV vector that lacks sufficient intrastrand base pairing to enhance said expression."

86. Under 28 U.S.C. §§ 2201 and 2202, Counterclaim-Plaintiffs are entitled to a declaratory judgment that the claims of the '729 patent are invalid for failure to comply with one or more of the requirements for patentability set forth in Title 35 of the U.S. Code, including §§ 102, 103, and/or 112.

COUNT IX
(Declaratory Judgment of Non-Infringement of the '054 Patent)

87. Counterclaim-Plaintiffs repeat and incorporate by reference the allegations contained in Paragraphs 1-86 as though fully set forth herein.

88. Upon information and belief, on or about January 10, 2012, the USPTO issued U.S. Patent No. 8,093,054 ("the '054 patent"), titled "Metabolically Activated Recombinant Viral Vectors and Methods for their Preparation and Use," to assignee Genzyme Corporation. In this action, Genzyme Corporation has pled that it is the owner of the '054 patent.

89. Counterclaim-Defendants allege that the manufacture, use, or sale of rAAV vectors for ZOLGENSMA® infringes the '054 patent.

90. By asserting their claims against Counterclaim-Plaintiffs for infringement of the '054 patent, Counterclaim-Defendants have created an actual, substantial, and continuing justiciable case or controversy regarding the infringement of the claims of the '054 patent.

91. Counterclaim-Plaintiffs have not infringed, directly or indirectly, any valid or enforceable claim of the '054 patent.

92. For example, Counterclaim-Plaintiffs do not infringe one or more of the claims of the ’054 patent because the ’054 patent is invalid and not enforceable. One cannot be liable for infringing an invalid patent.

93. As a further example, Counterclaim-Plaintiffs do not infringe one or more of the claims of the ’054 patent because ZOLGENSMA® does not meet each and every element recited in the claims, including “wherein the rAAV vector genome comprises in the 5’ to 3’ direction: a 5’ AAV inverted terminal repeat (ITR) sequence, a first heterologous nucleotide sequence, an internal AAV ITR sequence, a second heterologous nucleotide sequence, and a 3’ AAV ITR sequence . . . .”

94. Under 28 U.S.C. §§ 2201 and 2202, Counterclaim-Plaintiffs are entitled to a declaratory judgment that they have not infringed, directly or indirectly, any valid and enforceable claim of the ’054 patent.

COUNT X
(Declaratory Judgment of Invalidity of the ’054 Patent)

95. Counterclaim-Plaintiffs repeat and incorporate by reference the allegations contained in Paragraphs 1-94 as though fully set forth herein.

96. Counterclaim-Defendants allege that the manufacture, use, or sale of rAAV vectors for ZOLGENSMA® infringes the ’054 patent.

97. By asserting their claims against Counterclaim-Plaintiffs for infringement of the ’054 patent, Counterclaim-Defendants have created an actual, substantial, and continuing justiciable case or controversy regarding the validity of the claims of the ’054 patent.

98. The claims of the ’054 patent are invalid for failure to comply with one or more of the requirements for patentability set forth in Title 35 of the U.S. Code, including §§ 102, 103, and/or 112.

99. For example, one or more of the claims of the ’054 patent are invalid as anticipated and/or obvious under 35 U.S.C. §§ 102 and/or 103 over at least one or more prior art references, including Hermens (1997) Thesis chapter 7 90-9010642-1; Samulski et al. (1987) *Journal of Virology* 61:3069-3101; WO 99/11764; Dong et al. (1996) *Human Gene Therapy* 7:2101-2112; Hörster et al. (July 1999) *Gene Therapy* 6:1231-1238; Homann et al. (1993) *Nucleic Acids Research* 21:2809-2814; Phillips et al. (1997) *Hypertension* 29[part2]:374-380; Welch et al. (1998) *Clinical and Diagnostic Virology* 10:163-171; Su et al. (1996) *Human Gene Therapy* 7:463-470; Zolutukhin (1996) *J Virol* 70:4646-4654; WO 97/32018; WO 1999/047691; Mamounas et al. (1995) *Gene Therapy* 2:429-432; WO 97/17458; WO 95/28493; WO 95/13392; WO 95/28948; Ferrari et al. (1997) *Nature Medicine* 3(11):1295-1297; Ferrari et al. (1996) *Journal of Virology* 70(5):3227-3234; Xiao et al. (1998) *Journal of Virology* 72(3):2224-2232; Muzyczka (1992) *Current Topics in Microbiology and Immunology* 158:97-129.

100. As a further example, the ’054 patent is invalid under 35 U.S.C. § 112 for lack of written description. The specification of the ’054 patent fails to provide adequate written description to reasonably convey to those skilled in the art that the inventor had possession of the claimed subject matter, including an rAAV vector with “a 5’ AAV inverted terminal repeat (ITR) sequence, a first heterologous nucleotide sequence, an internal AAV ITR sequence, a second heterologous nucleotide sequence, and a 3’ AAV ITR sequence” as claimed.

101. As a further example, the ’054 patent is invalid under 35 U.S.C. § 112 for lack of enablement. The specification of the ’054 patent fails to enable a person of ordinary skill to make and use the full scope of the claims without undue experimentation, including an rAAV vector with “a 5’ AAV inverted terminal repeat (ITR) sequence, a first heterologous nucleotide

sequence, an internal AAV ITR sequence, a second heterologous nucleotide sequence, and a 3' AAV ITR sequence" as claimed.

102. As a further example, the '054 patent is invalid under 35 U.S.C. § 112 for indefiniteness. The specification of the '054 patent fails to inform, with reasonable certainty, the scope of the invention, thus making it indefinite, including the meaning of "wherein the first heterologous nucleotide sequence can form intrastrand base pairs with the second nucleotide sequence along most or all of its length."

103. Under 28 U.S.C. §§ 2201 and 2202, Counterclaim-Plaintiffs are entitled to a declaratory judgment that the claims of the '054 patent are invalid for failure to comply with one or more of the requirements for patentability set forth in Title 35 of the U.S. Code, including §§ 102, 103, and/or 112.

COUNT XI
(Declaratory Judgment of Non-Infringement of the '542 Patent)

104. Counterclaim-Plaintiffs repeat and incorporate by reference the allegations contained in Paragraphs 1-103 as though fully set forth herein.

105. Upon information and belief, on or about June 9, 2015, the USPTO issued U.S. Patent No. 9,051,542 ("the '542 patent"), titled "Compositions and Methods to Prevent AAV Vector Aggregation," to assignee Genzyme Corporation. In this action, Genzyme Corporation has pled that it is the owner of the '542 patent.

106. Counterclaim-Defendants allege that the manufacture, use, or sale of rAAV vectors for ZOLGENSMA® infringes the '542 patent.

107. By asserting their claims against Counterclaim-Plaintiffs for infringement of the '542 patent, Counterclaim-Defendants have created an actual, substantial, and continuing justiciable case or controversy regarding the infringement of the claims of the '542 patent.

108. Counterclaim-Plaintiffs have not infringed, directly or indirectly, any valid or enforceable claim of the ’542 patent.

109. For example, Counterclaim-Plaintiffs do not infringe one or more of the claims of the ’542 patent because the ’542 patent is invalid and not enforceable. One cannot be liable for infringing an invalid patent.

110. As a further example, Counterclaim-Plaintiffs do not infringe one or more of the claims of the ’542 patent because ZOLGENSMA® does not meet each and every element recited in the claims, including the element “wherein the purified AAV vector particles are stored in the composition without significant aggregation.”

111. Under 28 U.S.C. §§ 2201 and 2202, Counterclaim-Plaintiffs are entitled to a declaratory judgment that they have not infringed, directly or indirectly, any valid and enforceable claim of the ’542 patent.

COUNT XII
(Declaratory Judgment of Invalidity of the ’542 Patent)

112. Counterclaim-Plaintiffs repeat and incorporate by reference the allegations contained in Paragraphs 1-111 as though fully set forth herein.

113. Counterclaim-Defendants allege that the manufacture, use, or sale of rAAV vectors for ZOLGENSMA® infringes the ’542 patent.

114. By asserting their claims against Counterclaim-Plaintiffs for infringement of the ’542 patent, Counterclaim-Defendants have created an actual, substantial, and continuing justiciable case or controversy regarding the validity of the claims of the ’542 patents.

115. The claims of the ’542 patent are invalid for failure to comply with one or more of the requirements for patentability set forth in Title 35 of the U.S. Code, including §§ 102, 103, and/or 112.

116. For example, one or more of the claims of the ’542 patent are invalid as anticipated and/or obvious under 35 U.S.C. §§ 102 and/or 103 over at least one or more prior art references, including Zolotukhin et al (U.S. Patent No. 6,146,874); Anderson et al (U.S. Patent No. 4,138,287); Zhang et al (U.S. Patent No. 6,194,191); and Chen et al. *J Pharm. Sci.* (1994) 83:1657-1661.

117. As a further example, the ’542 patent is invalid under 35 U.S.C. § 112 for lack of written description. The specification of the ’542 patent fails to provide adequate written description to reasonably convey to those skilled in the art that the inventor had possession of the claimed subject matter, including using solutions using ionic strengths higher than 510 mM.

118. As a further example, the ’542 patent is invalid under 35 U.S.C. § 112 for lack of enablement. The specification of the ’542 patent fails to enable a person of ordinary skill to make and use the full scope of the claims without undue experimentation, including the claimed compositions for the storage of purified AAV vector particles “wherein the ionic strength of the composition is greater than 200 mM.”

119. As a further example, the ’542 patent is invalid under 35 U.S.C. § 112 for indefiniteness. The specification of the ’542 patent, when read in light of the prosecution history, fails to inform those skilled in the art with reasonable certainty about the scope of the invention, including what is encompassed by the element “wherein the purified AAV vector particles are stored in the composition without significant aggregation.”

120. Under 28 U.S.C. §§ 2201 and 2202, Counterclaim-Plaintiffs are entitled to a declaratory judgment that the claims of the ’542 patent are invalid for failure to comply with one or more of the requirements for patentability set forth in Title 35 of the U.S. Code, including §§ 102, 103, and/or 112.

PRAYER FOR RELIEF

WHEREFORE, Counterclaim-Plaintiffs respectfully request that judgment be entered in their favor as follows:

A. For the First Amended Complaint to be dismissed, with prejudice, and Counterclaim-Defendants' requests for relief be denied entirely.

B. For a declaration that the claims of U.S. Patent Nos. 6,596,535; 7,125,717; 7,785,888; 7,846,729; 8,093,054; and 9,051,542 are invalid, unenforceable, and/or not infringed.

C. For Counterclaim-Defendants to be preliminarily and permanently enjoined from asserting that Counterclaim-Plaintiffs, or their officers, agents, representatives, stockholders, and/or customers, have infringed or are infringing any of the claims of the Asserted Patents.

D. For Counterclaim-Defendants to be preliminarily and permanently enjoined from bringing suit against Counterclaim-Plaintiffs, or their officers, agents, representatives, stockholders, and/or customers, for infringement of any of the Asserted Patents.

E. For a declaration that this case is an exceptional case under 35 U.S.C. § 285 and that Counterclaim-Plaintiffs be awarded their attorneys' fees, costs, and other expenses incurred in this action.

F. For Counterclaim-Plaintiffs to be awarded such other and further relief as the Court may deem just and proper.

Dated: April 4, 2022

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